

I (WE) CLAIM:

1. A method for adapting signals from an ultrasound transducer for an ultrasound system, the method comprising:
 - (a) processing signals from a plurality of elements within a transducer assembly; and
 - (b) converting the processed signals to a different form appropriate for the ultrasound system, the conversion being in the transducer assembly.
2. The method of Claim 1 wherein (a) comprises partially beamforming signals for each of a plurality of sub-apertures.
3. The method of Claim 2 wherein (a) comprises for each sub-aperture:
 - (a1) applying different phase shifts to signals from different elements; and
 - (a2) combining the signals.
4. The method of Claim 2 wherein (a) comprises partially beamforming demultiplexed signals.
5. The method of Claim 1 wherein (b) comprises converting digital signals to analog signals.
6. The method of Claim 1 wherein (b) comprises mixing the signals.
7. The method of Claim 1 wherein (a) comprises processing within a transducer probe housing and wherein (b) comprises converting within a connector housing releasable from the ultrasound system, a cable connecting the transducer probe housing with the connector housing.
8. The method of Claim 1 wherein (a) comprises processing signals from the plurality, M, of elements of a multi-dimensional array of the elements to a lesser plurality, N, of processed signals.

9. A transducer assembly for adapting signals from an ultrasound transducer for an ultrasound system, the assembly comprising:
 - a cable connected with the ultrasound transducer; and
 - a connector housing at least partially enclosing a detachable connector and a signal processing device, the cable electrically connecting elements of the ultrasound transducer to the signal processing device, and the detachable connector operable to connect and disconnect from the ultrasound system and operable to output signals responsive to the signal processing device and the ultrasound transducer.
10. The assembly of Claim 9 wherein the ultrasound transducer comprises a multidimensional array of M elements and the detachable connector having a plurality N of outputs for the output signals, M being greater than N.
11. The assembly of Claim 9 wherein the signal processing device comprises a digital-to-analog converter.
12. The assembly of Claim 9 wherein the signal processing device comprises a mixer.
13. The assembly of Claim 9 wherein the signal processing device comprises a partial beamformer.
14. The assembly of Claim 9 wherein the signal processing device comprises a demultiplexer.
15. The assembly of Claim 9 wherein the signal processing device is operable to convert the processed signals to a different form appropriate for the ultrasound system.

16. A method for adapting signals from an ultrasound transducer for an ultrasound system, the method comprising:
- (a) partially beamforming signals from a plurality, M , of elements of the ultrasound transducer, the partial beamforming being performed in a transducer assembly;
 - (b) converting the partially beamformed signals to a different form appropriate for the ultrasound system, the conversion being performed in the transducer assembly; and
 - (c) outputting the converted, partially beamformed signals to a plurality, N , of beamformer channels of the ultrasound system, N being less than M .
17. The method of Claim 16 wherein (a) comprises sub-array mixing and (b) comprises mixing to a frequency of the beamformer channels.
18. The method of Claim 16 further comprising:
- (d) multiplexing the signals from the plurality of elements adjacent a transducer probe; and
 - (e) demultiplexing the signals within a connector housing;
- wherein (a) comprises partially beamforming the demultiplexed signals and (b) comprises converting digital signals to analog signals.
19. The method of Claim 16 wherein (b) and (c) are performed with at least one signal processing device in a detachable connector housing of the transducer assembly.
20. The method of Claim 16 wherein (a) comprises partially beamforming from M signals to N signals, M being at least a multiple of two of N .
21. The method of Claim 16 wherein (a) comprises partially beamforming for at least two simultaneously received beams.

22. A method for adapting signals from an ultrasound transducer for an ultrasound system, the method comprising:
- (a) processing signals from a plurality of elements within a transducer housing; and
 - (b) further processing the signals sent from the transducer housing to a detachable connector within the detachable connector.
23. The method of Claim 22 wherein (b) comprises converting the processed signals of (a) to a different form appropriate for the ultrasound system.
24. The method of Claim 22 wherein (a) comprises partially beamforming signals for each of a plurality of sub-apertures.
25. The method of Claim 22 wherein (b) comprises one of:
- (b1) digital-to-analog converting of the signals; and
 - (b2) mixing the signals.